DOCUMENT RESUME

ED 473 753 CE 084 522

TITLE	Illinois Occupational Skill Standards: Telecommunications Technician Cluster.
INSTITUTION	Illinois Occupational Skill Standards and Credentialing Council, Carbondale.
SPONS AGENCY	Illinois State Board of Education, Springfield.
PUB DATE	2003-01-00
NOTE	124p.; Product developer was Kris Kersey. For other Illinois Occupational Skill Standards, see ED 443 016-034, ED 448 350-355, ED 454 375-377, ED 461 746-749, ED 465 055-057 and ED 465 112-113, ED 465 887 and CE 084 437-443.
AVAILABLE FROM	Curriculum Publications Clearinghouse, Western Illinois University Horrabin Hall 46, 1 University Circle, Macomb, IL 61455-1390. Tel: 800-322-3905 (Toll Free); Fax: 309-298-2869; e-mail: CPC@wiu.edu; Web site: http://www.standards.siu.edu/. For full text: http://www.standards.siu.edu/ members/subcouncil/communication/ Tel ecom_for_web.pdf.
PUB TYPE	Guides - Non-Classroom (055)
EDRS PRICE	EDRS Price MF01/PC05 Plus Postage.
DESCRIPTORS	Academic Standards; *Competency Based Education; Definitions; Education Work Relationship; Educational Objectives; Equipment Maintenance; Equipment Utilization; Evaluation Criteria; Glossaries; High Schools; Job Analysis; Job Skills; Occupational Clusters; Occupational Information; *Performance Based Assessment; Postsecondary Education; Program Guides; *State Standards; Statewide Planning; Student Certification; Student Evaluation; *Technical Occupations; *Telecommunications; Two Year Colleges; Vocational Education; Vocational Evaluation
IDENTIFIERS	*Illinois

ABSTRACT

This document, which is intended as a guide for workforce preparation program providers, details the Illinois Occupational Skill Standards for programs preparing students for employment in the telecommunications technician occupational cluster. The document begins with a brief overview of the Illinois perspective on occupational skills standards and credentialing, the process used to develop the skill standards, assumptions underlying the standards, and performance skill levels. Presented next are skill standards for 47 tasks typically performed in the following areas of telecommunications: cable installation; equipment installation; job setup and preparation; enclosure; cable repair and fault location; and preventive maintenance. Each skill standard statement contains the following components: (1) the actual skill standard (including the conditions of performance, work to be performed, and performance criteria); (2) performance elements; and (3) performance assessment criteria. The following items are appended: a telecommunications technician cluster glossary; a general glossary of terms; lists of the Illinois Occupational Skill Standards and Credentialing Council, Communications Subcouncil, and Telecommunications Technician Cluster Standards Development Committee; and a list of necessary workplace skills. (AJ)

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ILLINOIS

OCCUPATIONAL SKILL STANDARDS

TELECOMMUNICATIONS TECHNICIAN CLUSTER

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SPECIAL THANKS

The IOSSCC wishes to thank the Illinois Telecommunications Association for its in-kind donation hosting skill standard development meetings. Without their assistance, this project would not be complete.

ILLINOIS OCCUPATIONAL SKILL STANDARDS

TELECOMMUNICATIONS TECHNICIAN CLUSTER

Endorsed for Illinois
by the
Illinois Occupational Skill Standards
and Credentialing Council

A MESSAGE FROM THE ILLINOIS OCCUPATIONAL SKILL STANDARDS AND CREDENTIALING COUNCIL

Preparing youth and adults to enter the workforce and to be able to contribute to society throughout their lives is critical to the economy of Illinois. Public and private interest in establishing national and state systems of industry-driven skill standards and credentials is growing in the United States, especially for occupations that require less than a four-year college degree. This interest stems from the understanding that the United States will increasingly compete internationally and the need to increase the skills and productivity of the front-line workforce. The major purpose of skill standards is to promote education and training investment and ensure that this education and training enables students and workers to meet industry standards that are benchmarked to our major international competitors.

The Illinois Occupational Skill Standards and Credentialing Council (IOSSCC) has been working with industry subcouncils, the Illinois State Board of Education and other partnering agencies to adopt, adapt and/or develop skill standards for high-demand occupations. Skill standards products are being developed for a myriad of industries, occupational clusters and occupations. This document represents the collaborative effort of the Communications Subcouncil and the Telecommunications Technician Cluster Standards Development Committee. The IOSSCC also wishes to thank the Illinois Telecommunications Association for their assistance throughout the development of this project.

These skill standards will serve as a guide to workforce preparation program providers in defining content for their programs and to employers to establish the skills and standards necessary for job acquisition. These standards will also serve as a mechanism for communication among education, business, industry and labor.

We encourage you to review these standards and share your comments. This effort has involved a great many people from business, industry and labor. Comments regarding their usefulness in curriculum and assessment design, as well as your needs for in-service and technical assistance in their implementation are critical to our efforts to move forward and improve the documents.

Questions concerning this document may be directed to:

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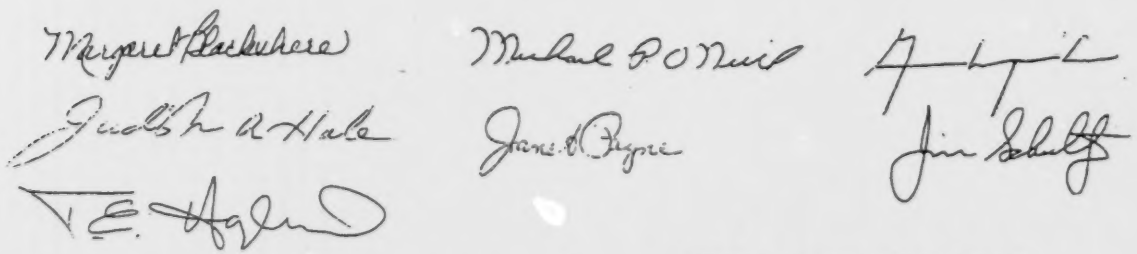
We look forward to your comments.

Sincerely,

The Members of the IOSSCC



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THE ILLINOIS PERSPECTIVE

The Occupational Skill Standards Act (PA 87-1210) established the nine-member Illinois Occupational Skill Standards and Credentialing Council (IOSSCC). Members of the IOSSCC represent business, industry and labor and are appointed by the Governor or State Superintendent of Education. The IOSSCC, working with the Illinois State Board of Education, Illinois Community College Board, Illinois Board of Higher Education, Illinois Department of Employment Security and Illinois Department of Commerce and Community Affairs, has created a common vision for workforce development in Illinois.

VISION

It is the vision of the IOSSCC to add value to Illinois' education and workforce development system by developing and supporting the implementation of a statewide system of industry defined and recognized skill standards and credentials for all major skilled occupations that provide strong employment and earnings opportunities.

The IOSSCC endorses occupational skill standards and credentialing systems for occupations that

- require basic workplace skills and technical training,
- provide a large number of jobs with either moderate or high earnings, and
- provide career advancement opportunities to related occupations with moderate or high earnings.

Subcouncils and Standards Development Committees

Under the direction of the IOSSCC, and in cooperation with industry organizations and associations, industry subcouncils have been formed to review, approve and promote occupational skill standards and credentialing systems. The industry subcouncils are: Agriculture and Natural Resources; Applied Science and Engineering;* Business and Administrative Services; Communications; Construction;* Education and Training Services;* Energy and Utilities; Financial Services; Health and Social Services; Hospitality; Legal and Protective Services;* Manufacturing; Marketing and Retail Trade; and Transportation, Distribution and Logistics. (*Indicates subcouncils identified for future development.)

Standards development committees are composed of business, labor and education representatives who are experts in the related occupational cluster. They work with the product developer to

- develop or validate occupational skill standards,
- identify related academic skills,
- develop or review assessment or credentialing approaches, and
- recommend endorsement of the standards and credentialing system to the industry subcouncil.

Expected Benefits

The intent of skill standards and credentialing systems is to promote investment in education and training and ensure that students and workers are trained to meet industry standards that are benchmarked to the state's major international competitors. Skill standards and credentialing systems have major benefits that impact students and workers, employers and educators in Illinois.

Student and Worker Benefits

- Help workers make better decisions about the training they need to advance their careers
- Allow workers to communicate more effectively to employers what they know and can do
- Improve long-term employability by helping workers move more easily among work roles
- Enable workers to help their children make effective academic and career and technical decisions

Employer Benefits

- Focus the investment in training and reduce training costs
- Boost quality and productivity and create a more flexible workforce
- Improve employee retention
- Improve supplier performance
- Enlarge the pool of skilled workers

Educator Benefits

- Keep abreast of a rapidly changing workplace
- Contribute to curriculum and program development
- Provide students with better career advice
- Strengthen the relationship between schools and local businesses
- Communicate with parents because educators have up-to-date information about industry needs

The IOSSCC is currently working with the Illinois State Board of Education and other state agencies to integrate the occupational standards with the Illinois Learning Standards which describe what students should know and be able to do as a result of their education. The IOSSCC is also working to integrate workplace skills—problem solving, critical thinking, teamwork, etc.—with both the Illinois Learning Standards and the Illinois Occupational Skill Standards.

IOSSCC Requirements for Occupational Skill Standards

Illinois Occupational Skill Standards define what an individual should know and the expected level of performance required in an occupational setting. The standards focus on the most critical work performances for an occupation or occupational area.

Endorsed Occupations

Any occupational skill standards and credentialing system seeking IOSSCC endorsement must

- represent an occupation or occupational cluster that meets the criteria for IOSSCC endorsement, including economic development, earnings potential and job outlook;
- address both content and performance standards for critical work functions and activities for an occupation or occupational area;
- ensure formal validation and endorsement by a representative group of employers and workers within an industry;
- provide for review, modification and revalidation by an industry group a minimum of once every five years;
- award credentials based on assessment approaches that are supported and endorsed by the industry and consistent with nationally recognized guidelines for validity and reliability;
- provide widespread access and information to the general public in Illinois; and
- include marketing and promotion by the industry in cooperation with the partner state agencies.

Recognized Occupations

Occupations that do not meet the earnings criteria for IOSSCC endorsement but are part of an occupational cluster that is being developed may be presented for recognition by the IOSSCC. IOSSCC members encourage individuals to pursue occupational opportunities identified as endorsed occupations. Examples of occupations that do not meet the endorsement criteria, but have been recognized by the IOSSCC are Certified Nurse Assistant and Physical Therapy Aide.

Skill Standards Components

Illinois Occupational Skill Standards must contain the following components:

- Performance Area
- Performance Skill
- Skill Standard
- Performance Elements
- Performance Assessment Criteria

The IOSSCC further identified three components (*Conditions of Performance, Work to be Performed and Performance Criteria)* of the Skill Standard component as critical work functions for an occupation or industry/occupational area. The sample format for Illinois Occupational Skill Standards on the following page provides a description of each component of an occupational skill standard.

The sample format also illustrates the coding at the top of each page identifying the state, fiscal year in which standards were endorsed, subcouncil abbreviation, cluster abbreviation and standard number. For example, the twenty-fifth skill standard in the Telecommunications Technician Cluster, which has been developed by the Communications Subcouncil, would carry the following coding: IL.03.COMM.TTC.25.

SUMMARY OF WORK TO BE PERFORMED. SUMMARY IS BRIEF AND BEGINS WITH AN ACTION VERB.

IL.FY.SUBCOUNCIL. CLUSTER. STANDARD NO.

PERFORMANCE AREA

SKILL STANDARD

CONDITIONS OF PERFORMANCE

A comprehensive listing of the information, tools, equipment and other resources provided to the person(s) performing the work.

WORK TO BE PERFORMED

An overview of the work to be performed in demonstrating the performance skill standard. This overview should address the major components of the performance. The detailed elements or steps of the performance are listed under "Performance Elements."

PERFORMANCE CRITERIA

The assessment criteria used to evaluate whether the performance meets the standard. Performance criteria specify product/outcome characteristics (e.g., accuracy levels, appearance, results, etc.) and process or procedure requirements (e.g., safety requirements, time requirements, etc.).

PERFORMANCE ELEMENTS

Description of the major elements or steps of the overall performance and any special assessment criteria associated with each element.

PERFORMANCE ASSESSMENT CRITERIA

Listing of required testing, certification and/or licensing.

Product and process used to evaluate the performance of the standard.

PRODUCT

Description of the product resulting from the performance of the skill standard.

PROCESS

Listing of steps from the Performance Elements which must be performed or the required order or performance for meeting the standard.

I. Developmental Process and Occupational Definitions

A. Developmental Process

After studying labor market information, the Communications Subcouncil recommended that performance skill standards be developed for telecommunications occupations. The identified career, telecommunications technician cluster, meets the criteria established by the Illinois Occupational Skill Standards and Credentialing Council (IOSSCC) for performance skill standard development, education and training requirements, employment opportunities, earnings potential and career opportunities. A product developer knowledgeable about the telecommunications field began the process of performance skill identification. The product developer prepared an outline and framework designed to address the major skills expected in the workplace. The framework addresses skill requirements common to telecommunications technicians.

The subcouncil recommended that the final skill standards product be presented to the IOSSCC. The IOSSCC reviewed the skill standards and met with the product developer, state liaison and chair of the subcouncil. Based on the review, the IOSSCC voted to endorse the telecommunications technician cluster skill standards.

1. Resources

The telecommunications standards were based on descriptions and competencies identified through researching the career area. Information from the Illinois Telecommunications Association (ITA), the Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO), the Foundation for Rural Education and Development and the National Telephone Cooperative Association (NTCA) was incorporated into this product. Current texts used by educational institutions were also incorporated.

2. Standards Development Committee

A standards development committee composed of educators and individuals who work in the telecommunications industry was convened. The framework, initial outline, matrix and draft skill standards were presented to the standards development committee for review, revision, adjustment and validation. Additional skill standard statements with performance elements and assessment criteria were developed in accordance with the direction established by the IOSSCC and were presented to the standards development committee for review and revision.

B. Occupational Definitions

The function of the telecommunications technician is to install and maintain equipment designed to provide clean, noise-free communications signals to and from the customer. The technician also maintains the cable plant and support structures in the community. These structures include poles, cable support, towers and enclosures. The matrix categorizes the skills and technicians (i.e., outside plant service technician, inside plant service technician, outside plant construction technician, cable TV Installer) by the type of work required which is determined by the location of the work and the equipment being serviced. Telecommunications technicians are trained and qualified to work on many types of equipment. Therefore, the definitions for the above named matrix categories are encompassed in one definition of the telecommunications technician.

Telecommunications Technician

The telecommunications technician evaluates, installs, repairs and replaces components on communication systems. This requires the ability to read and understand cable maps, electrical wiring diagrams and test equipment. In addition to these duties, the technician must possess the ability to see colors for color-coded cable identification. Technicians who handle wireless communications must have a Federal Communications Commission (FCC) general radio license.

II. Employment and Earnings Opportunities

A. Education and Training Requirements

Instructional programs prepare individuals to apply technical knowledge and skills to repair, install, service and maintain the operating condition of communication systems. This includes instruction in diagnostic techniques, use of testing equipment, principles of communication signals and electricity and electronics as they relate to the repair of communication systems. These programs may be offered through participation in union apprenticeships, community colleges, vocational schools and informal on-the-job training. In union shops many individuals are trained through either apprenticeship programs or vendor-specific seminars. Union apprenticeship programs base training on a combination of classroom, technical and workplace instruction and are usually delivered both at the work site and in the school/college setting. Vendor-specific seminars offer a certificate of completion once the program in a particular field of study is accomplished. In nonunion shops most individuals begin as helpers and learn skills informally on the job. For both union and nonunion shops, a high school diploma or GED is required. Courses in math, science and basic electronics are preferred. Community college programs consist of academic and technical courses taught for one or two years leading to a one-year certificate of completion or an Associate of Applied Science degree. Some programs may also lead to four-year baccalaureate degrees.

B. Employment Opportunities

Employment for telecommunications technicians is expected to expand faster than average in both Illinois and the nation through 2010. About 325 job openings are projected in Illinois each year as a result of growth and replacements. Nationally, it is projected that by the year 2008 employment in the occupations of outside plant service technician and cable TV installer will grow by 24.4%. Employment for inside plant service technicians is projected to increase by 20.8%. Employment for outside plant construction technicians is projected to increase by 6.4%.

A strong career ladder exists between entry-level telecommunications positions and the manager/supervisor of operations. Many employers require their manager/supervisor to have five or more years of field experience in order to be able to assist the technician if necessary. Experienced telecommunications technicians may advance to a position of supervisor. Others may be promoted to engineering or may take positions as a vendor product specialist. Some technicians may establish their own contracting businesses. Training requirements and advancement opportunities will vary depending on the employer.

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C. **Earnings Opportunities**

	Annual Earnings 2001	
	Entry	**Experienced**
Outside Plant Construction Technician	$27,500	$45,800
Outside Plant Service Technician	$29,300	$44,600
Cable TV Installer	$31,300	$47,800
Inside Plant Service Technician	$31,600	$51,100

Sources: *2001 Occupational Employment Statistics: Wage Data, Occupational Projections 2010, LMI Source, and Horizons Career Information System,* Illinois Department of Employment Security, Economic Information and Analysis Division and Bureau of Labor Statistics, Office of Employment Projections.

III. Assessment and Credentialing Systems

The IOSSCC recognizes that industry commitment for third-party assessment is beneficial and requests that each standards development committee and/or subcouncil identify the most beneficial method for assessing the standards.

IV. Industry Support and Commitment

The primary areas currently identified for industry support and commitment of occupational skill standards are development, updating and marketing. Business and industry partners may identify future uses of occupational skill standards such as credentialing/certification, career development of employees and specifications for outsource training programs.

A. Industry Commitment for Development and Updating

1. The development of skill standards for the telecommunications technician cluster was achieved by the Communications Subcouncil and the standards development committee. Names of the persons serving on the subcouncil and the standards development committee are located in the appendices.

2. In developing the products, the following steps were completed:

   a. Identification and prioritization of a career ladder, identifying jobs by name
   b. Review of resources
   c. Development of draft matrix of performance standards
   d. Development of a performance standard that was identified on the matrix
   e. Convening of standards development committee of incumbent workers
   f. Review, validation and approval of skill standards by the standards development committee
   g. Review and approval of standards by subcouncil
   h. Endorsement of skill standards by the IOSSCC

B. Industry Commitment for Marketing

The Communications Subcouncil is committed to marketing and obtaining support and endorsement from the leading industry associations impacted by the skill standards. Upon endorsement of the standards by the IOSSCC, the subcouncil strongly recommends that professional trade groups, academic groups, etc. develop and provide an in-service/seminar package to promote skill standard awareness and to obtain full industry support and commitment for the development of a full industry marketing plan.

The Communications Subcouncil encourages the availability of skill standards to the public including learners, parents, workers, educators at all levels, employers and industry personnel.

ASSUMPTIONS FOR TELECOMMUNICATIONS TECHNICIAN CLUSTER SKILL STANDARDS

Skill standards assume that individuals have received education and/or training in a setting such as a secondary, postsecondary and/or apprenticeship/on-the-job training program and have the background knowledge necessary for performing the skill standards contained in this publication. The education and/or training includes instruction for the proper handling and operation of materials, tools and equipment required for performing the skills including the purpose of use, when to use, how to use and any related safety issues. The instructional/training program must adhere to all local, state and federal licensing and/or certification requirements as set by law, if applicable.

The Telecommunications Technician Cluster Standards Development Committee developed these skill standards based on the following assumptions:

1. Workplace skills (employability skills) are expected of the individual. Socialization skills needed for work are related to lifelong career experience and are not solely a part of the initial schooling process. These are not included with this set of statements.
2. Specific policies and procedures of the work site will be made known to the individual and will be followed.
3. Time elements outlined for the skill standards result from the experience and consideration of the panel of experts who made up the standards development committee.
4. Skills will progress from simple to complex. Once a skill has been successfully completed, it will be incorporated into more complex skills.
5. Skill standards describe the skill only and do not detail the background knowledge or theory related to the particular skill base. Although the skill standard enumerates steps to successful demonstration, rote approaches to the outcomes are not prescribed.
6. Skills will be completed in an expedient and safe manner.
7. Skill standards are selected because they meet workplace needs and are designed to meet professional standards of practice.
8. Skill standards do not replace, supersede or substitute for procedure manuals.
9. Skill standards do not supersede or take the place of industry certification or graduation from an accredited program of study.
10. The telecommunications technician is knowledgeable in the following areas of general testing:
    a. Proper reading and interpreting of a schematic or wiring diagram
    b. Proper use of ammeter
    c. Proper use of multimeter
    d. Proper use of ohmmeter
    e. Proper use of voltmeter
    f. Isolation of item when checking for continuity
    g. Meter setting for proper function and range for item being tested if not autoranging
11. The telecommunications technician is knowledgeable in the following areas of safety:
    a. Wearing of appropriate safety items such as hard hat, shoes, eye protection, hearing protection, dust protection, etc.
    b. Wearing of appropriate and safe clothing
    c. Proper disposal of materials in accordance with EPA requirements
    d. Proper and safe method of using tools of trade

12. Individual skills refer to fault identification, location, repair and/or replacement procedures. The following are proper diagnostic assumptions and procedures that should be followed in making appropriate conclusions in electrical testing:
    a. Caution should always be used to prevent the possibility of an electrical shock. Lack of caution when working around high voltage could be fatal.
    b. Technician understands danger involved and proceeds with caution in proper use of test equipment.
    c. Technician understands that some electrical components must be tested with power applied to component as determined by required test being performed.
    d. Ammeter must be set to proper range when checking current draw to device. Multiplier may be required depending on circuit being tested.
    e. Power must be off when using ohmmeter. The meter could be damaged if power is on.
    f. Voltmeter must be set to proper voltage range to prevent damage to meter. Test leads must contact only terminals being tested. Care should be exercised to prevent a short by not allowing test leads to make contact with adjacent terminals or case.

PERFORMANCE SKILL LEVELS

	Outside Plant Construction Technician	Outside Plant Service Technician	Inside Plant Service Technician	Cable TV Installer
CABLE INSTALLATION				
Perform Copper Cable Splice	•	•		
Install Aerial Drop	•	•		•
Install Buried Drop	•	•		
Place Buried Cable	•			•
Place Self-Supported Aerial Cable	•			•
Place Aerial Support Strand and Lashed Cable	•			•
Install F Type Connector on Coaxial Cable Drop				•
Terminate Coaxial Trunk Cable				•
Install Coaxial Grounding Block				•
Splice Fiber Cable (Fusion)	•		•	•
Splice Fiber Cable (Mechanical)	•		•	•
Terminate Fiber Optic Cable	•	•	•	•
Install Premises Wiring		•	•	•
Terminate Cat 5e and 6 Inside Wire (IW) in Work Area Outlet (WAO) (Female Connector)		•	•	•
Terminate Cat 5e and 6 Inside Wire (IW) with Plug (Male Connector)		•	•	•
EQUIPMENT INSTALLATION				
Install Cross-Connect Block and Terminate Inside Wire (IW)		•	•	
Install Key System or Electronic Private Automatic Branch Exchange (EPABX)		•	•	
Install Network Interface Device (NID)		•	•	
Install T1 Repeater Housing			•	
Install Coaxial Distribution Device/Terminal Access Point (TAP) on Aerial Cable				•
Install Pole	•			•
Install Guy	•			•
Install Internal Computer Hardware			•	
Install Computer Software		•	•	
Install Residential Telephone Jack		•		
Install Digital, Fiber or Line Circuit Card			•	
Install Circuit per Order on Frame at Central Office (CO)			•	
Install Customer Asymmetrical Digital Subscriber Line (ADSL) Premises Equipment		•		
Install T1, High Speed Digital Subscriber Line (HDSL) and Channel Service Unit (CSU)/Digital Service Unit (DSU) Equipment		•		
Install Residential Ground Rod System	•	•	•	•
Install Fire-stop	•	•	•	•

PERFORMANCE SKILL LEVELS

	Outside Plant Construction Technician	Outside Plant Service Technician	Inside Plant Service Technician	Cable TV Installer
EQUIPMENT INSTALLATION *(Continued)*				
Install Cable Pair Line Treatment Device	•	•		
Replace Digital, Fiber or Line Circuit Card			•	
JOB SETUP AND PREPARATION				
Set Up Paired Copper Splice		•		
Set Up Fiber Splice and Enclosure		•		
Prepare Pedestal Splice Work Area		•		
Prepare Aerial Splice Work Area		•		
Prepare Buried Splice Work Area		•		
Prepare Underground Splice Work Area		•		
ENCLOSURE: INSTALLATION, OPEN AND CLOSE				
Install Pedestal	•	•		•
Install Aerial Enclosure	•	•		•
Install Buried Splice Enclosure	•	•		•
CABLE REPAIR AND FAULT LOCATION				
Analyze, Locate and Repair Fault on Paired Copper Cable		•		•
Analyze, Locate and Repair Fault on Fiber Cable		•		•
Analyze, Locate and Repair Fault on Coaxial Cable		•		•
PREVENTATIVE MAINTENANCE				
Perform Air Dryer Maintenance and Pressure Check		•	•	
Maintain Generator		•	•	

PERFORM COPPER CABLE SPLICE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Enclosure and splicing materials
Cable prepared for splicing
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Perform copper cable splice.

PERFORMANCE CRITERIA

Copper cable splice is performed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of cable, splice (straight or branch) and environmental conditions.

Example: A straight splice of 100-pair plastic insulated cable (PIC) cable using individual connectors is completed in 90 minutes. A straight splice of 100-pair PIC cable using modular connectors is completed in 45 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Splice cable using splice connectors per installation documentation.
4. Mark all binder groups with appropriate color binder ties.
5. Dress splice for enclosure skill procedures.
6. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of splicing cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Cable is spliced.

PROCESS

All performance elements for splicing cable are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install aerial drop.

PERFORMANCE CRITERIA

Aerial drop is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on drop type and environmental conditions.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Layout installation path.
4. Determine proper drop attachment (i.e., J-hook, span clamp, etc.) location on pole and building.
5. Install drop attachment device on pole.
6. Install drop on pole attachment device with drip loop.
7. Terminate drop at pole.
8. Install drop attachment device on building.
9. Raise drop and attach to supports along route.
10. Install drop to attachment device on building.
11. Route drop to network interface device (NID) location and secure to building.
12. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing aerial drop.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Aerial drop is installed.

PROCESS

All performance elements for installing aerial drop are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL BURIED DROP.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and digging equipment
Materials and supplies
Documentation
Manufacturers' specifications and technical resources
Personal protective equipment (PPE)
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install buried drop.

PERFORMANCE CRITERIA

Buried drop is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on buried drop type, environmental conditions, length of run and homeowner availability to address personal facility locations.

Example: Buried drop is installed in 90 minutes using a vibrating plow for a 100-foot run.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Verify that underground facilities have been located by observing Joint Utility Locating Information for Excavators (JULIE) markings.
4. Verify homeowner facilities (e.g., irrigation systems, underground utilities, septic system, etc.).
5. Lay out drop path and network interface device (NID) location.
6. Bury drop between NID location and pedestal/service point.
7. Insert drop into service point following vendor specifications.
8. Terminate drop and connect to service point.
9. Route drop to NID location and secure to building.
10. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing buried drop.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Buried drop is installed.

PROCESS

All performance elements for installing buried drop are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and digging equipment
Materials and supplies
Additional crew
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Place buried cable (plow, trench or bore).

PERFORMANCE CRITERIA

Buried cable is placed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of cable, length of run, number of crew available, environmental conditions and location.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Identify individual responsibilities within the team.
4. Verify that underground facilities have been located by observing Joint Utility Locating Information for Excavators (JULIE) markings.
5. Verify homeowner facilities (e.g., irrigation systems, underground utilities, septic system, etc.)
6. Prepare cable for burial.
7. Connect pulling eye and seal.
8. Plow, trench or horizontal bore to proper depth while maintaining cable path.
9. Pull/lay cable or duct in hole/trench.
10. Seal cable ends if enclosure is present; bring ends into enclosures and seal.
11. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of placing buried cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Buried cable is placed.

PROCESS

All performance elements for placing buried cable are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Basic tools and climbing and lifting devices
- Materials and supplies
- Down guys and anchors in place
- Additional crew
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Place self-supported aerial cable pole to pole.

PERFORMANCE CRITERIA

Self-supported aerial cable is placed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on environmental conditions, enclosure type and size of cable.

Example: Four spans/five poles are placed in four hours with a two-person crew and bucket truck.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Attach messenger to pole with dead end support or to previous messenger.
4. Pay out the cable along the pole route.
5. Attach messenger hardware (i.e., J-clamp) on each pole at specified location and lay cable in messenger hardware.
6. Pull messenger to proper tension.
7. Inspect each span for tension.
8. Dead end messenger.
9. Place messenger in clamp and secure at each pole.
10. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of placing self-supported aerial cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Self-supported aerial cable is placed.

PROCESS

All performance elements for placing self-supported aerial cable are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

PLACE AERIAL SUPPORT STRAND AND LASHED CABLE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Basic tools and climbing and lifting devices
- Materials and supplies
- Down guys and anchors in place
- Additional crew
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Place aerial support strand and lashed cable.

PERFORMANCE CRITERIA

Aerial support strand and lashed cable are placed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on environmental conditions, enclosure type and size of cable.

Example: Four spans/five poles are placed in four hours with a two-person crew and bucket truck.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Attach strand to pole with dead-end support or to previous strand.
4. Attach strand hardware on each pole at specified location.
5. Pay out strand along pole route and place loosely in suspension clamps at each pole.
6. Pull strand to proper tension from first dead-ended pole to end.
7. Inspect each span for tension.
8. Dead end strand.
9. Tighten suspension clamp at each pole.
10. Place a cable shoe on strand at beginning pole.

11. Slide cable through shoe and attach to pole.
12. Pull shoe out about four feet using hand tow line.
13. Pay out cable along the pole route.
14. Attach cable lasher next to pole and lash spinning wire to cable and strand using clamp.
15. Pull cable spinning machine about two feet by towline.
16. Place cable support strap and spacer.
17. Pull cable shoe and lasher towlines while dispensing cable from reel to next pole.
18. Place temporary lashing wire clamp (TLC) behind lasher.
19. Cut lashing wire.
20. Move cable shoe and spinning machine to other side of pole on strand.
21. Attach lashing wire clamps.
22. Place straps and spacers.
23. Repeat steps 16-21 to end of run.
24. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of placing aerial support strand and lashed cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Aerial support strand and lashed cable are placed.

PROCESS

All performance elements for placing aerial support strand and lashed cable are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL F TYPE CONNECTOR ON COAXIAL CABLE DROP.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Materials and supplies
Coaxial drop in place
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install F type connector on coaxial cable drop.

PERFORMANCE CRITERIA

An F type connector is installed on coaxial cable drop according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of cable, connector and environmental conditions.

Example: One end of an RG-11 outside cable is terminated in 15 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Select proper cable connector.
4. Prepare cable per connector manufacturer's specifications.
5. Attach connector to cable per manufacturers' specifications.
6. Ensure connector is attached per company policy and procedures.
7. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing F type connector on coaxial cable drop.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

F type connector is installed on coaxial cable drop.

PROCESS

All performance elements for installing F type connector on coaxial cable drop are critical and must be performed in sequence.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Terminate coaxial trunk cable with stinger.

PERFORMANCE CRITERIA

Coaxial trunk cable is terminated according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of cable, connector and environmental conditions.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Select proper cable connector (stinger).
4. Prepare cable per connector manufacturer's specifications.
5. Attach connector to cable per manufacturers' specifications.
6. Ensure connector is attached per company policy and procedures.
7. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of terminating coaxial trunk cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Coaxial trunk cable is terminated.

PROCESS

All performance elements for terminating coaxial trunk cable are critical and must be performed in sequence.

INSTALL COAXIAL GROUNDING BLOCK.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install coaxial grounding block.

PERFORMANCE CRITERIA

Coaxial grounding block is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill is typically 15 minutes but may vary based on environmental conditions and availability of a ground source.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Layout cable path and grounding block location.
4. Attach grounding block to structure.
5. Terminate cable if necessary.
6. Connect cable to ground block maintaining drip loops.
7. Connect grounding wire to a company acceptable grounding source and grounding block.
8. Attach ground wire to structure.
9. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing coaxial grounding block.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Coaxial grounding block is installed.

PROCESS

All performance elements for installing coaxial grounding block are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Materials and supplies
Fiber cable prepared for splicing
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Splice fiber cable using fusion splice equipment.

PERFORMANCE CRITERIA

Fiber cable is fusion spliced according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on environmental conditions, enclosure type and type of fiber cable.

Example: Individual splices are completed at a rate of 10 minutes per fiber.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Secure appropriate tools, equipment and components.
3. Put on PPE.
4. Clean fiber with gel remover.
5. Slide protective sleeve on one side of fiber.
6. Strip two inches of primary plastic buffer coating from fiber.
7. Clean fiber with alcohol.
8. Cleave fiber to fusion splicer specifications and properly dispose of scrap.
9. Place fiber to be spliced in fusion splicer.
10. Repeat steps 6-9 with corresponding fiber.
11. View fibers for cleave quality.
    a. Recleave if necessary.
    b. Proceed if cleave is acceptable.
12. Align fibers if necessary.

13. Fuse fibers.
14. Test splice for quality.
15. Remove fibers from fusion splicer.
16. Slide protective sleeve over splice and place in heat shrink oven.
17. Remove splice from oven and place in splice tray.
18. Repeat steps 3-16 with remaining fibers.
19. Perform enclosure procedures.
20. Test all fibers with optical time domain reflectometer (OTDR).
21. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of splicing fiber cable using fusion splice equipment.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Fiber cable is spliced using fusion splice equipment.

PROCESS

All performance elements for splicing fiber cable using fusion splice equipment are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different testing sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Materials and supplies
Fiber cable prepared for splicing
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Splice fiber cable using mechanical splice equipment.

PERFORMANCE CRITERIA

Fiber cable is spliced using mechanical splice equipment according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on environmental conditions, enclosure type and type of fiber cable.

Example: Individual splices are completed at a rate of 10 minutes per fiber.

PERFORMANCE ELEMENTS

1. Secure appropriate tools, equipment and components.
2. Put on PPE.
3. Clean fiber with gel remover.
4. Clean mechanical splice jig.
5. Place mechanical splice into jig.
6. Strip primary plastic buffer coating from fiber.
7. Clean fiber with alcohol.
8. Cleave fiber to mechanical splice specifications and properly dispose of scrap.
9. Clean fiber using tape tap method.
10. Place fiber to be spliced in mechanical splice and retention pads.
11. Repeat steps 6-10 with corresponding fiber.
12. Align fibers.

13. Activate mechanical splice (e.g., crimp, rotate, etc.).
14. Test splice for quality.
15. Remove splice and fibers from jig and place in splice tray.
16. Repeat steps 3-15 with remaining fibers.
17. Perform enclosure procedures.
18. Test all fibers with optical time domain reflectometer (OTDR).
19. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of splicing fiber cable using mechanical splice equipment.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Fiber cable is spliced using mechanical splice equipment.

PROCESS

All performance elements for splicing fiber cable using mechanical splice equipment are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different testing sequence may be used.

TERMINATE FIBER OPTIC CABLE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Materials and supplies
Cable placed and ready to terminate
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Terminate fiber optic cable.

PERFORMANCE CRITERIA

Fiber optic cable is terminated according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of cable, method used and connector.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Remove cable jacket and expose fibers to specified length.
4. Install breakout kit if required.
5. Install connectors per manufacturer's instructions.
6. Test per International Electrical and Electronic Engineers (IEEE) Fiber Optic System Test Procedure (FOSTP)-14 standard.
7. Place connectors in bulkhead if required.
8. Cap all unused terminations.
9. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of terminating fiber optic cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Fiber optic cable is terminated.

PROCESS

All performance elements for terminating fiber optic cable are critical and must be performed in sequence.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install premises wiring.

PERFORMANCE CRITERIA

Premises wiring is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on the difficulty of cable run, environmental conditions and scope of job.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Layout inside wire (IW) path and install conduit, ladder racks, cable trays or other cable support devices needed.
4. Visually inspect IW path for rough edges and constrictions and correct.
5. Place pull string in IW path if necessary.
6. Label each IW.
7. Group IWs to be pulled.
8. Pull the pull string from other end while feeding IW along IW path ensuring tension limits are not exceeded.
9. Leave service loop if required.
10. Pull enough IW to perform termination.
11. Dress, secure and fasten IW along path as required.
12. Label each IW at originating end accordingly.
13. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing premises wiring.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Premises wiring is installed.

PROCESS

All performance elements for installing premises wiring are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

TERMINATE CAT 5e AND 6 INSIDE WIRE (IW) IN WORK AREA OUTLET (WOA) (FEMALE CONNECTOR).

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools
- Materials and supplies
- IW in place
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Terminate Cat 5e and 6 IW in WAO.

PERFORMANCE CRITERIA

Cat 5e and 6 IW is terminated in WAO according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill is typically 15 minutes. Additional time may be required based on installation environment and specifications.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Mount WAO.
4. Attach IW to WAO.
5. Test and verify wire map and bandwidth capacity.
6. Label WAO.
7. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of terminating Cat 5e and 6 IW in WAO.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Cat 5e and 6 IW in WAO is terminated.

PROCESS

All performance elements for terminating Cat 5e and 6 IW in WAO are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

TERMINATE CAT 5e AND 6 INSIDE WIRE (IW) WITH PLUG (MALE CONNECTOR).

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools
- Materials and supplies
- IW in place
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Terminate Cat 5e and 6 IW with plug.

PERFORMANCE CRITERIA

Cat 5e and 6 IW is terminated with plug according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill is typically 15 minutes. Additional time may be required based on installation environment and specifications.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Remove jacket material.
4. Align conductors in appropriate order.
5. Trim conductors to one-half inch.
6. Slide conductors into connector while maintaining correct order.
7. Insert connector into crimp tool.
8. Crimp connector correctly.
9. Remove connector from crimp tool and inspect plug.
10. Test and verify wire map and bandwidth capacity.
11. Label IW.
12. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of terminating Cat 5e and 6 IW with plug.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Cat 5e and 6 IW is terminated with plug.

PROCESS

All performance elements for terminating Cat 5e and 6 IW with plug are critical and must be performed in sequence.

INSTALL CROSS-CONNECT BLOCK AND TERMINATE INSIDE WIRE (IW).

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools
- Materials and supplies
- IW in place
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Install cross-connect block and terminate IW.

PERFORMANCE CRITERIA

Cross-connect blocks are installed and IW is terminated according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on working conditions and type of IW and cross-connect block.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Mount cross-connect block to approved backing or frame.
4. Remove IW jacket.
5. Punch down IW conductor pairs to cross-connect device.
6. Repeat steps 4 and 5 until all IWs are terminated.
7. Test for connectivity and quality.
8. Label cross-connect blocks.
9. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing a cross-connect block and terminating IW.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Cross-connect block is installed and IW is terminated.

PROCESS

All performance elements for installing cross-connect block and terminating IW are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools
- Materials and supplies
- Inside wire (IW) in place
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Install a key system or EPABX.

PERFORMANCE CRITERIA

Key system or EPABX is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on size of key system or EPABX.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Unpack equipment, ensuring all components are accounted for and undamaged.
4. Prepare equipment for installation per manufacturers' recommendations (e.g., assembly of enclosures, installation of circuit cards, installation of ribbon cables, setting of any jumpers or switches).
5. Position, level and secure equipment and housing.
6. Install cable supports and cable organizers.
7. Connect system to authorized grounding source and power source or uninterruptible power source if available.
8. Connect system to customer premises wiring.
9. Repeat steps 3 - 8 for any remote modules.
10. Connect any remote modules to main frame.
11. Connect system to external peripheral devices if used.
12. Connect any network lines, outside cable lines or trunks.
13. Turn power on system and load system software if required.

14. Configure system per customer requirements.
15. Perform system checks for quality, functionality and customer acceptance.
16. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing a key system or EPABX.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Key system or EPABX is installed.

PROCESS

All performance elements for installing key system or EPABX are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools
- Materials and supplies
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Install NID.

PERFORMANCE CRITERIA

An NID is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on the type and size of the NID.

Example: A typical single line NID is installed in 15 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Unpack NID ensuring all parts are accounted for.
4. Mount NID to structure following employer recommendations.
5. Connect ground wire to authorized ground source and NID.
6. Connect drop wires to NID and check for connectivity and quality.
7. Connect station wires to NID.
8. Plug in protector if not already in place.
9. Test connectivity and quality.
10. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing an NID.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

An NID is installed.

PROCESS

All performance elements for installing an NID are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL T1 REPEATER HOUSING.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install T1 repeater housing.

PERFORMANCE CRITERIA

A T1 repeater housing is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on environmental conditions, enclosure type and size of cable.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Install mounting bracket.
4. Release pressure if the housing is pressurized.
5 Remove any debris or any packing and open housing.
6. Pull cable through housing boot and seal.
7. Insert the required repeater cards.
8. Connect cable pairs to repeater cards. (If pressurized enclosure, air core cable with air dam must be used.)
9. Ground housing to approved ground.
10. Perform power-on test.
11. Perform signal test.
12. Set cards for remote maintenance if not already set.
13. Close enclosure and seal.
14. Pressurize enclosure if required.

15. Close any access boxes and secure.
16. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing T1 repeater housing.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

A T1 repeater housing is installed.

PROCESS

All performance elements for installing T1 repeater housing are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL COAXIAL DISTRIBUTION DEVICE/TERMINAL ACCESS POINT (TAP) ON AERIAL CABLE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and climbing equipment
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install coaxial distribution device/TAP on aerial cable.

PERFORMANCE CRITERIA

Coaxial distribution device/TAP is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on environmental conditions and type of cable, connector and equipment used.

Example: An 8-port TAP connected on a through cable using a bucket truck is installed in 20 minutes excluding the terminating time. (See Skill 8.)

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Cut coaxial cable where TAP is to be located.
4. Separate lashing or strand supports from coaxial cable about two feet on both sides of cut.
5. Terminate coaxial ends.
6. Bend trunk line down at 45 degrees maintaining a three-inch radius.
7. Bend trunk line up at 90 degrees from initial bend maintaining a three-inch radius.
8. Bend trunk line down at 45 degrees from the 90-degree bend so that trunk line is parallel with strand.
9. Repeat steps 1 - 8 for other side of cable.
10. Attach TAP to strand.

11. Test each trunk line side quality and signal strength.
12. Connect TAP to each trunk terminal.
13. Test TAP output for quality and signal strength.
14. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing a coaxial distribution device/TAP on aerial cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Coaxial distribution device/TAP is installed on aerial cable.

PROCESS

All performance elements for installing a coaxial distribution device/TAP on aerial cable are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools, climbing and digging equipment
- Derrick digger (line) truck
- Additional crew
- Vehicle protective equipment
- Documentation
- Manufacturers' specifications and technical resources
- Personal protective equipment (PPE)
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Install pole.

PERFORMANCE CRITERIA

Pole is installed according to company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on pole size, setup and environmental conditions.

Example: Thirty-foot pole is installed in ideal conditions in 45 minutes based on a two-man crew.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Review appropriate documentation to determine proper pole type and depth specification.
4. Set up work area protection (WAP) zone.
5. Observe Joint Utility Locating Information for Excavators (JULIE) markings.
6. Unload pole.
7. Perform roofing of pole if needed.
8. Perform pole gaining if required.
9. Dig hole based on pole type, load and terrain type.
10. Place grounding coil and wire on pole if required.
11. Place pole in hole and adjust for cant, level and plumb.

12. Fill and tamp around pole.
13. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing a pole.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Pole is installed.

PROCESS

All performance elements for installing a pole are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools, climbing and digging equipment
Vehicle protective equipment
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install guy to support aerial cable system.

PERFORMANCE CRITERIA

Guy is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on guy type (head or down) and working and environmental conditions.

Example: A down guy is installed in 90 minutes under ideal conditions.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Set up work area protection (WAP) zone.
4. Review appropriate documentation to determine proper eyebolt height on pole(s), anchor installation specifications (if required) and strand size.
5. Ascend pole or use bucket truck.
6. Drill pole(s) for eyebolt(s).
7. Install eyebolt(s) and strand.
8. Install guy insulator if required.
9. Observe Joint Utility Locating Information for Excavators (JULIE) markings and install anchor and rod if required.
10. Feed strand through anchor rod eye or through eyebolt on other pole.
11. Pull strand to proper tension using hoist and grips.
12. Secure strand-affixing device.
13. Cut off excess strand and fasten tag end.

14. Place guy guard.
15. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing guy.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Guy is installed.

PROCESS

All performance elements for installing guy are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools
- Materials and supplies
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Install internal computer hardware.

PERFORMANCE CRITERIA

Internal computer hardware is installed according to computer and hardware manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on system configuration and hardware to be installed.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Disconnect power and external devices if necessary.
4. Remove cover.
5. Put on wrist grounding strap and attach to the chassis frame or grounding mat.
6. Set jumpers or switches as directed.
7. Insert circuit card per manufacturer's recommendations if needed.
8. Install hardware into open bay if needed.
9. Connect all required cables and/or power wires per manufacturers' specifications.
10. Close cover.
11. Reconnect all external devices if necessary.
12. Reconnect power.
13. Power on unit.
14. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing internal computer hardware.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Internal computer hardware is installed.

PROCESS

All performance elements for installing internal computer hardware are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL COMPUTER SOFTWARE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' or software developers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install computer software.

PERFORMANCE CRITERIA

Computer software is installed according to manufacturers' or software developers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on software requirements, system configuration and resources.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Turn unit power on.
4. Access software.
5. Perform setup routine.
6. Close setup routine after installation of software.
7. Power unit off and on as directed if necessary.
8. Verify that software is operating properly.
9. Exit software.
10. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing computer software.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Computer software is installed.

PROCESS

All performance elements for installing computer software are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and materials
Inside wire (IW) in place
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install residential telephone jack.

PERFORMANCE CRITERIA

Residential telephone jack is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of jack and working conditions.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Mount jack plate and terminate conductors.
4. Terminate IW in network interface device (NID).
5. Test circuit at jack to confirm operability and quality.
6. Clean up work area.
7. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing residential telephone jack.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Residential telephone jack is installed.

PROCESS

All performance elements for installing residential telephone jack are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install digital, fiber or line circuit card, which could include digital access multiline (DAML), T1, fiber optic transceiver, trunk, digital subscriber line (DSL) and switch line cards.

PERFORMANCE CRITERIA

Digital, fiber or line circuit card is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of card, location and time needed to complete testing.

Example: DAML card is installed in central office in approximately ten minutes.

PERFORMANCE ELEMENTS

Note: This installation can be performed in a central office or peripheral cabinet.

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Put on antistatic wrist strap and attach to chassis frame.
4. Access card shelf.
5. Determine proper card location.
6. Remove circuit card from packing and handle by ejector tabs or edge of card.
7. Align circuit card with housing track and insert until card is properly seated.
8. Close ejectors (if used) and secure card as necessary.
9. Connect appropriate cables or fiber jumpers.
10. Activate card from control access device.

11. Run diagnostics test for connectivity and quality.
12. Secure card shelf.
13. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing a digital, fiber or line circuit card.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Digital, fiber or line circuit card is installed.

PROCESS

All performance elements for installing digital, fiber or line circuit card are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL CIRCUIT PER ORDER ON FRAME AT CENTRAL OFFICE (CO).

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install circuit per order on main distribution frame (MDF) at CO.

PERFORMANCE CRITERIA

Circuit is installed per order on MDF at CO according to company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of circuit and location of each termination point on MDF.

Example: A voice circuit on a single-sided frame is installed at CO in approximately 15 minutes.

PERFORMANCE ELEMENTS

1. Review job ticket.
2. Put on PPE.
3. Locate each termination point on MDF.
4. Lay out wire path utilizing cable supports and wire organizers.
5. Terminate wires at each termination point following company procedures.
6. Ensure protection module is installed.
7. Test for connectivity and quality.
8. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing circuit per order on MDF at CO.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Circuit is installed per order on MDF at CO.

PROCESS

All performance elements for installing circuit per order on MDF at CO are critical. Performance elements are numbered to show an appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL CUSTOMER ASYMMETRICAL DIGITAL SUBSCRIBER LINE (ADSL) PREMISES EQUIPMENT.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools
Materials and supplies
ADSL circuit previously wired at central office main distribution frame
Existing Plain Old Telephone Service (POTS) in place
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install customer ADSL premises equipment.

PERFORMANCE CRITERIA

Customer ADSL premises equipment is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of customer premises wiring and number of local area network (LAN) locations.

Example: Residential ADSL circuit with drop already run is installed in approximately 45 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Mount POTS splitter housing next to network interface device (NID).
4. Disconnect customer premises wiring from NID.
5. Remove rubber grommet from POTS splitter and put a small incision in center.
6. Slide premises wiring through grommet and reinsert in POTS splitter housing.
7. Connect customer premises wiring to the correct POTS splitter "out" terminals.
8. Connect jumper cable from POTS splitter "in" terminals to customer premises side of NID.
9. Unplug all customer communication devices (e.g., telephones, caller I.D., fax machines, computers and modems) from customer premises wiring.

10. Connect one POTS filter between customer's device and premises wiring.
11. Connect a DSL modem, each LAN internet access device and the customer premises wiring.
12. Run diagnostics test for connectivity and quality.
13. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing customer ADSL premises equipment.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Customer ADSL premises equipment is installed.

PROCESS

All performance elements for installing customer ADSL premises equipment are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL T1, HIGH SPEED DIGITAL SUBSCRIBER LINE (HDSL) AND CHANNEL SERVICE UNIT (CSU)/ DIGITAL SERVICE UNIT (DSU) EQUIPMENT.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools
Materials and supplies
Circuit previously wired at central office on main distribution frame
Circuit in place to demarc
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install T1, HDSL and CSU/DSU equipment.

PERFORMANCE CRITERIA

The T1, HDSL and CSU/DSU equipment is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of equipment and circuit being installed.

Example: Residential CSU/DSU circuit with drop already in place is installed in approximately 30 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Connect power cord, CSU/DSU and wall outlet.
4. Connect CSU/DSU to control terminal or PC.
5. Configure CSU/DSU if required.
6. Connect all devices to CSU/DSU (e.g., LANs, PBXs, and Multiplexers [MUXs]).
7. Connect CSU/DSU to T1 network.
8. Run diagnostics test for connectivity, quality and functionality.
9. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing T1, HDSL and CSU/DSU equipment.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

The T1, HDSL and CSU/DSU equipment is installed.

PROCESS

All performance elements for installing T1, HDSL and CSU/DSU equipment are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

INSTALL RESIDENTIAL GROUND ROD SYSTEM.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools
- Materials and supplies
- Ground rod
- Personal protective equipment (PPE)
- Documentation
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Install residential ground rod system.

PERFORMANCE CRITERIA

Residential ground rod system is installed according to company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type and location of rod and environmental and working conditions.

Example: Ground rod system is installed in approximately 15 minutes under ideal conditions.

PERFORMANCE ELEMENTS

1. Review job ticket.
2. Put on PPE.
3. Observe Joint Utility Locating Information for Excavators (JULIE) markings and utility locations.
4. Locate point to install ground rod.
5. Dig small hole (eight inches diameter by six inches deep) at center of anticipated ground rod location.
6. Drive rod until top is two inches below ground level or other appropriate specification.
7. Connect appropriate grounding wire to rod using approved method.
8. Trench grounding wire to structure and route to network interface device (NID).
9. Test ground system for acceptability.
10. Cover trench and ground rod hole.

11. Support ground wire on structure using approved method.
12. Connect ground wire to NID.
13. Clean up work area.
14. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing residential ground rod system.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Residential ground rod system is installed.

PROCESS

All performance elements for installing residential ground rod system are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used for some elements.

INSTALL FIRE-STOP.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install fire-stop.

PERFORMANCE CRITERIA

Fire-stop is installed according to manufacturers' specifications and company policies and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of fire-stopping being installed.

Example: Fire-stop is installed around a 100-pair cable in a three-inch hole between the first and second floors of a building in approximately 30 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Place fire-stop material in opening as required.
4. Check other side of opening and repeat step 3 as needed.
5. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing fire-stop.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Fire-stop is installed.

PROCESS

All performance elements for installing fire-stop are critical and must be performed in sequence.

INSTALL CABLE PAIR LINE TREATMENT DEVICE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Basic tools, climbing and lifting devices and digging equipment
Enclosure and splicing materials
Line treatment device
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install cable pair line treatment device.

PERFORMANCE CRITERIA

Cable pair line treatment device is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of device, type and location of cable and environmental and working conditions.

Example: One-pair load coil on a 100-pair filled cable in a pedestal splice is installed in approximately 15 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Locate point to install line treatment device per job order.
4. Access cable by opening existing enclosure or setting up new splice point.
5. Mount line treatment device as required.
6. Identify and verify cable pair(s) to be treated.
7. Cut selected pair(s) if vacant or set up transfer clips if working line.
8. Splice in device following company procedures.
9. Remove transfer clips (if used).
10. Test circuit for continuity and device operability.
11. Close cable using proper enclosure and methodology.
12. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing cable pair line treatment device.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Cable pair line treatment device is installed.

PROCESS

All performance elements for installing cable pair line treatment device are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools
- Materials and supplies
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Replace digital, fiber or line circuit card, which could include digital access multiline (DAML), T1, fiber optic transceiver, trunk, digital subscriber line (DSL) and switch line cards.

PERFORMANCE CRITERIA

Digital, fiber or line circuit card is replaced according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of card, location and time needed to complete testing.

Example: DAML card is replaced in central office in approximately ten minutes.

PERFORMANCE ELEMENTS

Note: This replacement can be performed in a central office or peripheral cabinet.

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Put on antistatic wrist strap and attach to chassis frame.
4. Access card shelf.
5. Determine proper card location.
6. Put card out of service following company procedure.
7. Disconnect applicable cables or fiber jumpers if necessary.
8. Remove disabled card from shelf and store properly.
9. Remove replacement circuit card from packing and handle by ejector tabs or edge of card.

10. Align circuit card with housing track and insert until card is properly seated.
11. Close ejectors (if used) and secure card as necessary.
12. Connect appropriate cables or fiber jumpers.
13. Activate the card from the control access device.
14. Run diagnostics test for connectivity and quality.
15. Secure card shelf.
16. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of replacing a digital, fiber or line circuit card.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Digital, fiber or line circuit card is replaced.

PROCESS

All performance elements for replacing digital, fiber or line circuit card are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SET UP PAIRED COPPER SPLICE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and climbing and digging equipment
Enclosure and splicing materials
Cable placed for splicing
Work area prepared for splicing
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Prepare paired copper cable for splicing and enclosure.

PERFORMANCE CRITERIA

Paired copper cable is prepared for splicing and enclosure according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type and placement of cable (aerial, buried or underground), type of splice (straight or branch) and environmental and working conditions.

Example: A set-up for a straight splice of 100-pair PIC cable using a free-breathing closure on lashed aerial air-core cable is completed in 60 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Select appropriate enclosure type and size.
4. Complete splicing work area setup. (See Skills 36-39.)
5. Mark cables for sheath opening for selected enclosure.
6. Score sheath and remove suitable length.
7. Install shield bonds as required.
8. Place temporary bond strap across splice opening.
9. Remove dielectric core wrapper.
10. Tape individual binder groups at cut end if needed.
11. Mark all binder groups with appropriate color binder ties.

12. Splice conductors per Skill 1.
13. Dress splice for enclosure.
14. Remove temporary bond strap.
15. Install enclosure using manufacturer's recommended procedure.
16. Support splice enclosure and cable(s) as required.
17. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of preparing paired copper cable for splicing and enclosure.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Paired copper cable is prepared for splicing and enclosure.

PROCESS

All performance elements for preparing paired copper cable for splicing and enclosure are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SET UP FIBER SPLICE AND ENCLOSURE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

- Job ticket
- Tools and climbing and digging equipment
- Enclosure and splicing materials
- Cable placed for splicing
- Work area prepared for splicing
- Personal protective equipment (PPE)
- Documentation
- Manufacturers' specifications and technical resources
- Environmental and safety standards/regulations
- Local, state and federal standards/regulations
- Company policy and procedures

WORK TO BE PERFORMED

Prepare fiber cable for splicing and enclosure.

PERFORMANCE CRITERIA

Fiber cable is prepared for splicing and enclosure according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type and placement of cable (aerial, buried or underground), type of splice (butt or in-line) and environmental and working conditions.

Example: A set-up for a straight splice of a 48-fiber cable using a pressurized closure on lashed aerial cable is completed in 60 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Select appropriate enclosure type and size.
4. Complete splicing work area setup. (See Skills 36-39.)
5. Assemble closure as needed.
6. Mark cables for sheath opening for selected enclosure.
7. Score sheath and remove suitable length.
8. Install shield bonds as required.
9. Affix bonds in closure as required.
10. Remove dielectric core wrapper.
11. Secure central strength member in closure if required.

12. Clean all loose buffer tubes using appropriate cleaner.
13. Expose bare fibers by removing buffer tubes according to selected enclosure specifications.
14. Clean fibers with isopropyl alcohol and place in splice trays.
15. Splice fiber cable. (Refer to Skills 10 and 11.)
16. Dress splice for enclosure.
17. Install enclosure using manufacturer's recommended procedure.
18. Support splice enclosure and cable(s) as required.
19. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of preparing fiber cable for splicing and enclosure.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Fiber cable is prepared for splicing and enclosure.

PROCESS

All performance elements for preparing fiber cable for splicing and enclosure are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

PREPARE PEDESTAL SPLICE WORK AREA.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and digging equipment
Pedestal (set in place) and splicing materials
Cable placed in pedestal for splicing
Vehicle protective equipment
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Prepare pedestal splice work area.

PERFORMANCE CRITERIA

Pedestal splice work area is prepared according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of cable and splice (straight or branch) and working and environmental conditions.

Example: Work area preparation for a straight splice of 100-pair PIC cable in a pedestal on filled cable is completed in 20 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Set up work area protection (WAP) zone if needed.
4. Access pedestal.
5. Cut off excess cable four feet from top of pedestal.
6. Fill pedestal base with approved material as required.
7. Tie cables into place.
6. Proceed to Skill 34.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of preparing pedestal splice work area.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Pedestal splice work area is prepared.

PROCESS

All performance elements for preparing pedestal splice work area are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used for some elements.

PREPARE AERIAL SPLICE WORK AREA.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and aerial work equipment (ladder, bucket truck, etc.)
Enclosure and splicing materials
Cable placed for splicing
Vehicle protective equipment
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Prepare aerial splice work area.

PERFORMANCE CRITERIA

Aerial splice work area is prepared according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of cable and splice (straight or branch) and environmental conditions.

Example: Preparation for a straight splice of 100-pair PIC cable using a free-breathing closure on lashed cable is completed in 30 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Set up work area protection (WAP) zone.
4. Access aerial cable using ladder sling, platform or bucket truck.
5. Secure lashing wire with catch-off clamp (if required) four feet each direction from center of anticipated splice point.
6. Place temporary supports onto cable and messenger as required.
7. Proceed to Skill 34.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of preparing aerial splice work area.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Aerial splice work area is prepared.

PROCESS

All performance elements for preparing the aerial splice work area are critical and must be performed in sequence.

PREPARE BURIED SPLICE WORK AREA.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and digging equipment
Enclosure and splicing materials
Cable placed for splicing
Splice pit properly dug and secured per Occupational Safety and Health Administration (OSHA) regulations
Vehicle protective equipment
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Prepare buried splice work area.

PERFORMANCE CRITERIA

Buried splice work area is prepared according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of cable and splice (straight or branch) and working and environmental conditions.

Example: Work area preparation for a straight splice of 100-pair PIC cable using a gel-filled closure on filled cable is completed in 30 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Set up work area protection (WAP) zone.
4. Access buried cable splice pit.
5. Use hand shovel to expose cable five feet each direction from center of anticipated splice point.
6. Drive temporary cable support rods six inches from each end of anticipated closure location.
7. Cut off excess cable four feet from center of anticipated splice point.

8. Clean cables and secure to support rods.
9. Proceed to Skill 34.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of preparing buried splice work area.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Buried splice work area is prepared.

PROCESS

All performance elements for preparing buried splice work area are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used for some elements.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Tools and underground entry equipment
Enclosure and splicing materials
Cable placed for splicing
Vehicle protective equipment
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Prepare underground splice work area including manhole entry.

PERFORMANCE CRITERIA

Underground splice work area is prepared according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of manhole, manhole location, type of cable and splice (straight or branch) and environmental and working conditions (wet/dry, cold/warm, etc.).

Example: A set-up in a dry manhole for an underground straight splice of 600-pair cable using a pressurized closure on cu-pic cable is completed in three hours.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Review Occupational Safety and Health Administration (OSHA) confined spaces regulations.
4. Set up work area protection (WAP) zone.
5. Set up manhole entry equipment (e.g., pump, heater/ventilator, generator) per manufacturers' specifications.
6. Test manhole through its access hole for explosive gasses.
7. Remove manhole cover (lid).

8. Set up manhole guard rail and ring.
9. Pump manhole if needed, observing environmental concerns.
10. Purge manhole atmosphere and continue ventilation/heating process.
11. Place manhole ladder into hole and descend into manhole.
12. Set up explosimeter unit to test atmosphere continuously.
13. Wash down manhole if needed.
14. Route cables onto racks using cable jacks where necessary.
15. Place temporary supports on cable and racks as required.
16. Cut off excess cable to four feet beyond anticipated splice point center.
17. Proceed to Skill 34.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of preparing underground splice work area.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Underground splice work area is prepared.

PROCESS

All performance elements for preparing underground splice work area are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used for some elements.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Basic tools and digging equipment
Materials and supplies
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install pedestal.

PERFORMANCE CRITERIA

Pedestal is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on type of pedestal, location and environmental and working conditions.

Example: A six-inch diameter pedestal is installed during good weather conditions using stake mount in approximately 40 minutes.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Unpack pedestal and account for all parts.
4. Perform any pedestal setup assembly per manufacturer's instructions.
5. Observe for Joint Utility Locating Information for Excavators (JULIE) markings.
6. Place pedestal mounting system.
   a. Dig hole and set pole next to cable or pedestal location if pole mount is to be used.
   b. Dig hole and drive pedestal stake if stake mount is to be used.
7. Set pedestal and base to recommended level.
8. Attach any hardware to pole or stake per manufacturers' directions and attach pedestal housing.
9. Affix cable into pedestal.
10. Backfill any trench or holes created to set pedestal.

11. Fill base of pedestal with appropriate material (e.g., rock, sand, gravel, road pack or concrete) per company practice.
12. Place cover on pedestal.
13. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing pedestal.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Pedestal is installed.

PROCESS

All performance elements for installing pedestal are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Basic tools, climbing and lifting devices and digging equipment
Materials and supplies
Down guys and anchors in place
Additional crew
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install aerial enclosure.

PERFORMANCE CRITERIA

Aerial enclosure is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill is one hour based on a 100-pair cable but will vary based on environmental conditions, enclosure type and size of cable.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Unpack housing unit and account for all parts.
4. Measure and mark cable sheath and strand with white marker indicating cable opening.
5. Remove any lashing or webbing from strand and cable.
6. Tape or tie cable where sheath is to be removed.
7. Install grounding bonds to sheaths. In some enclosures you would connect grounding bonds to strand now.
8. Install splicing bond braid per manufacturer's specifications.
9. Cut end pieces' openings to correct size.
10. Place end pieces on cable in appropriate location.
11. Place enclosure over cable attaching it to strand.
12. Connect sheath bonds to strand and enclosure if not previously done.
13. Attach end pieces to enclosure.

14. Close enclosure and secure.
15. Return tools and equipment to proper location.
16. Clean up work area.
17. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of installing aerial enclosure.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulation are followed.

PRODUCT

Aerial enclosure is installed.

PROCESS

All performance elements for installing aerial enclosure are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used. (Some of the performance elements may have been completed in another skill.)

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Job ticket
Basic tools, climbing and lifting devices and digging equipment
Materials and supplies
Down guys and anchors in place
Additional crew
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Install a buried splice enclosure.

PERFORMANCE CRITERIA

Buried splice enclosure is installed according to manufacturers' specifications and company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill is one hour based on a 100-pair cable and will vary depending on environmental conditions, enclosure type and size of cable.

PERFORMANCE ELEMENTS

1. Review manufacturers' specifications and job ticket.
2. Put on PPE.
3. Unpack housing unit and account for all parts.
4. Perform any housing setup assembly per manufacturer's instructions.
5. Measure and mark cable sheath and strand with white marker, indicating cable opening.
6. Remove any dirt or grease from cable sheath at least eight inches on each side of sheath opening.
7. Remove any lashing or webbing from strand and cable.
8. Tape or tie cable where sheath is to be removed and install grounding bonds to sheaths.
9. Install splicing bond braid per manufacturer's specifications.
10. Cut end pieces' openings to correct size.

11. Place end pieces on cable in appropriate location.
12. Place enclosure over cable and end pieces.
13. Attach end pieces to enclosure.
14. Close enclosure and secure. Some enclosures may require filling of enclosure with a sealant.
15. Return tools and equipment to proper location.
16. Clean up work area.
17. Document work and changes per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance installing buried splice enclosure.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulation are followed.

PRODUCT

Buried splice enclosure is installed.

PROCESS

All performance elements for installing buried splice enclosure are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used. (Some of the performance elements may have been completed in another skill.)

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Trouble ticket
Prints
Tools and climbing, underground and digging equipment
Ohmmeter and assorted cable test gear
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Analyze, locate and repair fault on paired copper cable.

PERFORMANCE CRITERIA

Fault on paired copper cable is analyzed, located and repaired according to company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on location of cable, type of fault, fault location and environmental and working conditions.

PERFORMANCE ELEMENTS

1. Review trouble ticket and prints.
2. Put on PPE.
3. Isolate cable pair.
4. Test pair and shield for faults using ohmmeter or suitable test equipment.
5. Choose correct locating equipment as determined by results of step 4.
6. Measure distance to fault using at least two different pieces of test gear.
7. Locate point of fault using prints and physical measurements.
8. Retest pair and shield, using steps 6 and 7, from closer location if possible.
9. Access cable (aerial, buried or underground).
10. Open cable and effect necessary pair repairs.
11. Close cable using proper enclosure and methodology.
12. Retest pair(s) for integrity.
13. Restore service to subscriber and test for compliance.
14. Document work and clear trouble ticket per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of analyzing, locating and repairing fault on paired copper cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Fault on paired copper cable is analyzed, located and repaired.

PROCESS

All performance elements for analyzing, locating and repairing fault on paired copper cable are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Trouble ticket
Prints
Tools and climbing, underground and digging equipment
Optical Time Domain Reflectometer (OTDR), ground fault analyzer and assorted cable test gear
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Analyze, locate and repair fault on fiber cable.

PERFORMANCE CRITERIA

Fault on fiber cable is analyzed, located and repaired according to company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on location of cable, type of fault, fault location and environmental and working conditions.

PERFORMANCE ELEMENTS

1. Review trouble ticket and prints.
2. Put on PPE.
3. Test fiber faults using OTDR.
4. Test shield for faults using suitable test equipment.
5. Choose correct locating equipment as determined by results of step 4.
6. Measure distance to fault using test gear.
7. Locate point of fault using prints and physical measurements.
8. Retest fiber faults and shield, using steps 6 and 7, from closer location if possible.
9. Access cable (aerial, buried or underground).
10. Open cable and effect necessary repairs.
11. Close cable using proper enclosure and methodology.
12. Retest circuit for integrity.
13. Restore service to subscriber and test for compliance.
14. Document work and clear trouble ticket per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of analyzing, locating and repairing fault on fiber cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Fault on fiber cable is analyzed, located and repaired.

PROCESS

All performance elements for analyzing, locating and repairing fault on fiber cable are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

ANALYZE, LOCATE AND REPAIR FAULT ON COAXIAL CABLE.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Trouble ticket
Prints
Tools and climbing, underground and digging equipment
Time Domain Reflectometer (TDR), sweep analyzer and assorted cable test gear
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Analyze, locate and repair fault on coaxial cable.

PERFORMANCE CRITERIA

Fault on coaxial cable is analyzed, located and repaired according to company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on location of cable, type of fault, fault location and environmental and working conditions.

PERFORMANCE ELEMENTS

1. Review trouble ticket and prints.
2. Put on PPE.
3. Test circuit and shield for faults using suitable test equipment.
4. Choose correct locating equipment as determined by results of step 3.
5. Measure distance to fault using at least two different pieces of test gear.
6. Locate point of fault using prints and physical measurements.
7. Retest circuit and shield, using steps 5 and 6, from closer location if possible.
8. Access cable (aerial, buried or underground).
9. Open cable and effect necessary repairs.
10. Close cable using proper enclosure and methodology.
11. Retest circuit for integrity.
12. Restore service to subscriber and test for compliance.
13. Document work and clear trouble ticket per company procedure.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of analyzing, locating and repairing fault on coaxial cable.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Fault on coaxial cable is analyzed, located and repaired.

PROCESS

All performance elements for analyzing, locating and repairing fault on coaxial cable are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Water reading records
Tools and climbing, underground and digging equipment
Dry air record system
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Perform air dryer maintenance and pressure check.

PERFORMANCE CRITERIA

Air dryer maintenance and pressure check are performed according to company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill is approximately 30 minutes.

PERFORMANCE ELEMENTS

1. Review records for previous water readings.
2. Put on PPE.
3. Measure and record amount of water in accumulator.
4. Check and record pressure levels on each gauged leg from manifold.
5. Issue trouble ticket if water readings or pressure levels are incorrect.
6. Empty accumulator.
7. Check belts (if used) for wear and proper tension.
8. Check for proper oil level.
9. Perform alarm test.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of performing air dryer maintenance and pressure check.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Air dryer maintenance and pressure check are performed.

PROCESS

All performance elements for performing air dryer maintenance and pressure check are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

SKILL STANDARD

CONDITIONS OF PERFORMANCE

Given the following:

Tools
Personal protective equipment (PPE)
Documentation
Manufacturers' specifications and technical resources
Environmental and safety standards/regulations
Local, state and federal standards/regulations
Company policy and procedures

WORK TO BE PERFORMED

Maintain generator.

PERFORMANCE CRITERIA

Generator is maintained according to company policy and procedures.

Skill is performed with 100% accuracy.

Time required to complete the skill varies based on generator type, company's and manufacturers' maintenance procedures and environmental and working conditions.

PERFORMANCE ELEMENTS

1. Put on PPE.
2. Check and fill all fluids to proper levels.
3. Start generator.
4. Disconnect alternating current (AC) to Central Office (CO) through breaker.
5. Check CO for proper operation.
6. Connect generator to CO.
7. Check voltage and/or ampere meters for proper levels.
8. Disconnect generator from CO, reconnect AC source to CO, tag generator out of service and place a temporary generator at site if voltage or amp meters indicate problem.
9. Run generator for 20-30 minutes with CO on as load.
10. Perform alarm test.
11. Disconnect generator from CO.
12. Reconnect AC source to CO.
13. Shut off generator.

PERFORMANCE ASSESSMENT CRITERIA

Observe the performance of maintaining generator.

Environmental and safety standards/regulations are followed.

Local, state and federal standards/regulations are followed.

PRODUCT

Generator is maintained.

PROCESS

All performance elements for maintaining generator are critical. Performance elements are numbered to show appropriate sequence for completing the skill; however, a different sequence may be used.

Analog	Transmission method using continuous electrical signals, varying in amplitude or frequency in response to changes of sound, light, position, etc. impressed on a transducer in the sending unit. The opposite of analog is digital.
Asynchronous	Transmission method in which information is transferred one discrete character at a time and is delineated by a start and stop indicator at the beginning and end of the character. The opposite of asynchronous is synchronous transmission.
Bandwidth	Relative range of frequencies that can be passed without distortion by a transmission medium. Greater bandwidths mean a higher information carrying capacity of the transmission circuit. Bandwidth, usually measured in Hertz, is assessed as the number of bits that can be transferred per second.
Community antenna television (CATV) system	Commonly known as "cable-TV."
Central office (CO)	Facility of a telecommunications common carrier where calls are switched. In local area exchanges, central offices switch calls within and between the 10,000-line exchange groups that can be addressed uniquely by the area code and first three digits of a phone number.
Copper pair	Two insulated copper wires twisted around each other. The twists vary in length and reduce crosstalk.
Channel service unit (CSU)/digital service unit (DSU)	Usually a customer-owned customer premise equipment (CPE) device that provides an interface between digital equipment (i.e., codec) and transmission facilities that comply with Federal Communications Commission (FCC) requirements. A CSU often includes network switching and control and/or line-conditioning capabilities.
dB	Abbreviation for decibel. The decibel is the standard unit of measure for expressing the amount of signal power gained or lost in a transmission circuit.
Digital added main line (DAML)	Pair gain device allowing for more than one communication circuit per pair.
Ethernet	Popular local area data communications network, originally developed by Xerox Corp. which accepts transmissions from computers and terminals.
Facilities	Transmission lines, switches and other physical components used to provide telecommunications service.

Fiber optics	Technology based on thin filaments of glass or other transparent materials used as the medium for transmitting coded light pulses that represent data, image and sound. Fiber optic technology offers extremely high transmission speeds.
Key Telephone System (KTS)	Multiline telephone system offering a limited range of features. Key systems are popular among smaller businesses as their main telephone system. They are also found in large businesses as a form of extension to their big primary phone system. Key systems are characterized by manual selection of outgoing lines, their small size and relatively low price.
Local area network (LAN)	Transmission network encompassing a limited area, such as a single building or several buildings in close proximity, widely used to link personal computers so that they can share information and peripheral devices.
Local loop	Communications channel, usually a physical line, between the subscriber's location and his local central office; also known as the subscriber loop.
Modem (modulator-demodulator)	Electronic device that allows computers to communicate over standard telephone lines. It transforms digital signal into analog signal and transmits to another modem which then reconstructs the digital signal from the analog signal.
Multiplexing	Electronic or optical process that combines a large number of lower-speed transmission lines into one high-speed line by splitting the total available bandwidth of the high-speed line into narrower bands (frequency division), or by allotting a common channel to several different transmitting devices, one at a time in sequence (time division). Multiplexing devices are widely employed in networks to improve efficiency by concentrating traffic. A multiplexer is also known as a mux.
Network	Any system designed to provide one or more access paths for communications between users at different geographic locations that may include designs for voice, data, facsimile images and/or video images.
Network interface device (NID)	Physical point in a telephone subscriber's home or place of business where the telephone devices and/or inside wiring of the subscriber are connected to the transmission lines of the local telephone service provider.
Original equipment manufacturer (OEM)	Manufacturer of equipment that is resold by another vendor who usually substitutes their name for that of the manufacturer on the product.
Pair-gain system	Transmission system that uses concentrators or multiplexers so that fewer wire pairs may be used than would otherwise be required to provide service to a given number of subscribers.

Private branch exchange (PBX)	Device installed on the customer's premises that enables switching of multiple incoming and outgoing lines between multiple internal phones. In addition, the typical PBX provides for the selection of outside lines per user defined criteria. Also referred to as electronic private automatic branch exchange (EPABX).
Plain old telephone service (POTS)	Basic telephone lines whose primary purpose is the transmission of human speech.
Premises wiring	Customer-owned metallic or optical-fiber communications transmission lines installed within or between buildings.
Stinger	Coaxial trunk line end terminal.
T-1	Digital transmission link capable of handling 1.544 mega bits per second.
Trunk	Line of communication containing multiple channels.
Wide area network (WAN)	Network that extends LANs to other LANs, typically over a wide geographical area using communications lines provided by a common carrier.

Academic Skills	Skills (and related knowledge) contained in the subject areas and disciplines addressed in most national and state educational standards, including English, mathematics, science, etc.
Assessment	A process of measuring performance against a set of standards through examinations, practical tests, performance observations and/or the completion of work portfolios.
Content Standard	A specification of what someone should know or be able to do to successfully perform a work activity or demonstrate a skill.
Critical Work Functions	Distinct and economically meaningful sets of work activities critical to a work process or business unit which are performed to achieve a given work objective with work outputs that have definable performance criteria. A critical work function has three major components: • **Conditions of Performance:** The information, tools, equipment and other resources provided to a person for a work performance. • **Work to Be Performed:** A description of the work to be performed. • **Performance Criteria:** The criteria used to determine the required level of performance. These criteria could include product characteristics (e.g., accuracy levels, appearance, etc.), process or procedure requirements (e.g., safety, standard professional procedures, etc.) and time and resource requirements. The IOSSCC requires that these performance criteria be further specified by more detailed individual performance elements and assessment criteria.
Credentialing	The provision of a certificate or award to an individual indicating the attainment of a designated set of knowledge and skills and/or the demonstration of a set of critical work functions for an industry/occupational area.
Illinois Occupational Skill Standards and Credentialing Council (IOSSCC)	Legislated body representing business and industry which establishes skill standards criteria, endorses final products approved by the industry subcouncil and standards development committee and assists in marketing and dissemination of occupational skill standards.
Industry	Type of economic activity, or product or service produced or provided in a physical location (employer establishment). They are usually defined in terms of the Standard Industrial Classification (SIC) system.

Industry Subcouncil	Representatives from business/industry and education responsible for identifying and prioritizing occupations for which occupational performance skill standards are adapted, adopted or developed. They establish standards development committees and submit developed skill standards to the IOSSCC for endorsement. They design marketing plans and promote endorsed skill standards across the industry.
Knowledge	Understanding the facts, principles, processes, methods and techniques related to a particular subject area, occupation or industry.
Occupation	A group or cluster of jobs, sharing a common set of work functions and tasks, work products/services and/or worker characteristics. Occupations are generally defined in terms of a national classification system including the Standard Occupational Classification (SOC), Occupational Employment Statistics (OES) and the Dictionary of Occupational Titles (DOT).
Occupational Cluster	Grouping of occupations from one or more industries that share common skill requirements.
Occupational Skill Standards	Specifications of content and performance standards for critical work functions or activities and the underlying academic, workplace and occupational knowledge and skills needed for an occupation or an industry/occupational area.
Occupational Skills	Technical skills (and related knowledge) required to perform the work functions and activities within an occupation.
Performance Standard	A specification of the criteria used to judge the successful performance of a work activity or the demonstration of a skill.
Product Developer	Individual contracted to work with the standard development committee, state liaison, industry subcouncil and IOSSCC for the adaptation, adoption or development of skill standards content.
Reliability	The degree of precision or error in an assessment system so repeated measurements yield consistent results.

Skill	A combination of perceptual, motor, manual, intellectual and social abilities used to perform a work activity.
Skill Standard	Statement that specifies the knowledge and competencies required to perform successfully in the workplace.
Standards Development Committee	Incumbent workers, supervisors and human resource persons within the industry who perform the skills for which standards are being developed. Secondary and postsecondary educators are also represented on the committee. They identify and verify occupational skill standards and assessment mechanisms and recommend products to the industry subcouncil for approval.
State Liaison	Individual responsible for communicating information among all parties (e.g., IOSSCC, subcouncil, standard development committee, product developer, project director, etc.) in skill standard development.
Third-Party Assessment	An assessment system in which an industry-designated organization (other than the training provider) administers and controls the assessment process to ensure objectivity and consistency. The training provider could be directly involved in the assessment process under the direction and control of a third-party organization.
Validity	The degree of correspondence between performance in the assessment system and job performance.
Workplace Skills	The generic skills essential to seeking, obtaining, keeping and advancing in any job. These skills are related to the performance of critical work functions across a wide variety of industries and occupations including problem solving, leadership, teamwork, etc.

Margaret Blackshere	AFL-CIO
Judith Hale	Hale Associates
Terry Hoyland	Caterpillar University Caterpillar, Inc.
Michael O'Neill	Chicago Building Trades Council
Janet Payne	United Samaritans Medical Center
Gene Rupnik	Hospitality Industry
Jim Schultz	Illinois Retail Merchants Association Walgreen Company

Larry Benda	Training Manager Madden Communications
Doug Dougherty	President Illinois Telephone Association
Mike Gilley	Business Development Manager Hewlett Packard
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Greg Holcomb	Director of Human Resources Southern Illinois University School of Medicine
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John Maxson	Executive Vice-President Speedcolor, Inc.
Larry Miller	Director of Switch Engineering Illinois Consolidated Communications
Candace Benwall	Executive Director Chicago Software Association
Dennis Sienko	Executive Director American Electronics Association
Greg Sutton	President Terasys
John Kopatz	State Liaison Illinois State Board of Education

APPENDIX E

TELECOMMUNICATIONS TECHNICIAN CLUSTER STANDARDS DEVELOPMENT COMMITTEE

Frank Adams	Verizon Bloomington, IL
G.W. (Bill) Carle	McDonough Telephone Cooperative Colchester, IL
Doug Dougherty	Illinois Telecommunications Association Springfield, IL
Patrick Gill	Electrical Joint Apprenticeship Training Trust Alsip, IL
John Highhouse	Lincoln Trail College Robinson, IL
Melvin Moore	McDonough Telephone Cooperative Colchester, IL
Ron Mueller	Harrisonville Telephone Company Waterloo, IL
Willie Nastasiak	Verizon Bloomington, IL
Earl D. Reppel	RTA Systems Milmine, IL
Darrell Schmidt	Gallatin River Communications Pekin, IL
Jeff Williams	Wabash Telephone Cooperative Louisville, IL
Gene Wilson	Lake Land College Mattoon, IL
Kris Kersey	Product Developer Lake Land College
John Kopatz	State Liaison Illinois State Board of Education

A. Developing an Employment Plan	1. Match interests to employment area. 2. Match aptitudes to employment area. 3. Identify short-term work goals. 4. Match attitudes to job area. 5. Match personality type to job area. 6. Match physical capabilities to job area. 7. Identify career information from counseling sources. 8. Demonstrate a drug-free status.
B. Seeking and Applying for Employment Opportunities	1. Locate employment opportunities. 2. Identify job requirements. 3. Locate resources for finding employment. 4. Prepare a resume. 5. Prepare for job interview. 6. Identify conditions for employment. 7. Evaluate job opportunities. 8. Identify steps in applying for a job. 9. Write job application letter. 10. Write interview follow-up letter. 11. Complete job application form. 12. Identify attire for job interview.
C. Accepting Employment	1. Apply for social security number. 2. Complete state and federal tax forms. 3. Accept or reject employment offer. 4. Complete employee's Withholding Allowance Certificate Form W-4.
D. Communicating on the Job	1. Communicate orally with others. 2. Use telephone etiquette. 3. Interpret the use of body language. 4. Prepare written communication. 5. Follow written directions. 6. Ask questions about tasks.
E. Interpreting the Economics of Work	1. Identify the role of business in the economic system. 2. Describe responsibilities of employee. 3. Describe responsibilities of employer or management. 4. Investigate opportunities and options for business ownership. 5. Assess entrepreneurship skills.
F. Maintaining Professionalism	1. Participate in employment orientation. 2. Assess business image, products and/or services. 3. Identify positive behavior. 4. Identify company dress and appearance standards. 5. Participate in meetings in a positive and constructive manner. 6. Identify work-related terminology. 7. Identify how to treat people with respect.

G. Adapting to and Coping with Change	1. Identify elements of job transition. 2. Formulate a transition plan. 3. Identify implementation procedures for a transition plan. 4. Evaluate the transition plan. 5. Exhibit ability to handle stress. 6. Recognize need to change or quit a job. 7. Write a letter of resignation.
H. Solving Problems and Critical Thinking	1. Identify the problem. 2. Clarify purposes and goals. 3. Identify solutions to a problem and their impact. 4. Employ reasoning skills. 5. Evaluate options. 6. Set priorities. 7. Select and implement a solution to a problem. 8. Evaluate results of implemented option. 9. Organize workloads. 10. Assess employer and employee responsibility in solving a problem.
I. Maintaining a Safe and Healthy Work Environment	1. Identify safety and health rules/procedures. 2. Demonstrate the knowledge of equipment in the workplace. 3. Identify conservation and environmental practices and policies. 4. Act during emergencies. 5. Maintain work area. 6. Identify hazardous substances in the workplace.
J. Demonstrating Work Ethics and Behavior	1. Identify established rules, regulations and policies. 2. Practice cost effectiveness. 3. Practice time management. 4. Assume responsibility for decisions and actions. 5. Exhibit pride. 6. Display initiative. 7. Display assertiveness. 8. Demonstrate a willingness to learn. 9. Identify the value of maintaining regular attendance. 10. Apply ethical reasoning.
K. Demonstrating Technological Literacy	1. Demonstrate basic keyboarding skills. 2. Demonstrate basic knowledge of computing. 3. Recognize impact of technological changes on tasks and people.
L. Maintaining Interpersonal Relationships	1. Value individual diversity. 2. Respond to praise or criticism. 3. Provide constructive praise or criticism. 4. Channel and control emotional reactions. 5. Resolve conflicts. 6. Display a positive attitude. 7. Identify and react to sexual intimidation/harassment.
M. Demonstrating Teamwork	1. Identify style of leadership used in teamwork. 2. Match team member skills and group activity. 3. Work with team members. 4. Complete a team task. 5. Evaluate outcomes.

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Printed by the Authority of the State of Illinois • January 2003 1M 0178-43 No. 631

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
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